Corn stover collection and logistics: The B/MAP experience

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Harvesting of crop residues as a material for non-conventional uses is on the increase. Driven in part by the need for adding value in the rural economy, by technological breakthroughs within the chemical industry, by concerns about world deforestation, and finally by increasing world demand for fossil fuel. Increasing populations, along with the growing quest for better quality of life will create even more demands on the natural resources. The opportunity for additional value from crop residues is enormous. At present this opportunity is not exclusive to big oil & gas companies, big forest product companies or big grain companies. Instead, this valuable opportunity is available to any that accept the challenges of an "*Industry in its Infancy*".

The members of Biomass Agri-Products L.L.C. (B/MAP) have become increasingly aware of the existing opportunity. Their involvement in crop residue harvest for Great Lakes Chemical Corporation, and Dickey Environmental Systems has provided a down-to-earth real understanding of the obstacles that must be overcome for manufactures, as well as for the producers. The firsthand experience gained by B/MAP over the past five years and the relentless determination of many individual members, have resulted in solutions being found and implemented.

B/MAP's Vision is to become a reliable, consistent and cost-effective supplier of renewable raw materials. The primary source of that raw material is the corn plant. We have come to realize that the most valuable component of the corn plant is not necessarily the kernel. Depending on the need of the manufacture, the most valuable could be the fiber, the pith, components of the cob, or even the silk. Few manufacturers are interested in the whole corn plant, per se. B/MAP is committed to increasing its ability to harvest the whole corn plant, and then dividing and separating the plant parts to provide manufacturers only those parts they have a need for.

Separation of components within a raw material in order to satisfy individual customers is not a new idea. Petroleum refineries, forest product, meat processors and other industries have developed very profitable industries by separating the parts of a raw material and marketing those parts to a now receptive or growing customer base.

This year in Iowa, cash corn at many grain elevators fell below $1.50 per bushel or around $50 per ton. While some components of the corn plant (such as pith and short fiber) aren't expected to achieve anywhere near the value of the grain, still other components (the cobs woody ring, and the plants long fiber) could command several times the value of the grain. Even the plants parts that previously had no buyers soon will have interested buyers, thanks to the phenomenal success of the chemical industry. New technology capable of converting cellulose into sugars and lignin opens up the need for extremely large volumes of raw material such as corn stover. B/MAP believes the maximum value of the whole corn plant can now be achieved. Although each component will find its own value, we believe the average value will exceed that of the grain.

B/MAP plans to increase its ability to serve as a collection point, by offering plant separation, storage and harvest methods that insure clean product every single year, along with just-in-time delivery of a competitively priced feedstock to the manufacturer. To accomplish these goals in the northern Corn Belt, we believe it will be necessary to develop infrastructure that presently does not exist.

An important step is to know where we are going so that the proper infrastructure is put into place. We are convinced that as the corn pickers of the past were replaced by the combines of today, "Whole Stalk Harvest Systems" will replace the combines of today. Presently the corn crop has two harvest talking place. Both cost in the neighborhood of $25 per acre i.e. combining, then baling, for a total of $50 per acre. Whole stalk harvest offers the potential to reduce the present total harvest cost by at least 50%. This reduction in total harvest cost will be in the form of savings to the producer but also reflect in the price paid for stover.

Whole stalk harvest will allow a reduction in the cost of transporting the stover without increasing the cost of transporting the grain. This will be accomplished by better utilization of the available transport space. By transporting the grain and the stover together we will be able to average the density. For example, about 42 pounds of corn fit in one cubic foot of space, while only 4 pounds of uncompressed stover fit in a cubic foot of space.

The whole stalk harvest system solves several other problems as well. The first thing we should see is that the conventional system is not treating the stover as a valued component of the corn crop. Presently the stover is left strewn about the ground, driven over by all of the equipment involved in the grain harvest. A whole stalk harvest could dramatically decrease or even eliminate dirt contamination, eliminate the need and cost of plastic twine or wrap, improve our ability to target specific parts of the stalk for harvest and open the stover harvest window, by eliminating stover contact with the ground.

Another project we feel crucial in order for B/MAP to become a reliable and consistent corn stover supplier deals with storage. The present system involves bales of dry stover stacked in the storage yard at risk to fire caused by lighting, spontaneous combustion or any other souce of ignition. B/MAP has completed some preliminary test, which leads us to believe that a better method is to add water and ensile the stover in a large horizontal concrete bunker. Ensiling, besides providing solutions to problems involving fire, has several other benefits. These benefits include further opening the harvest window, less deterioration and a reduction in risk of a failed harvest.

Conclusion

The methods of harvest, transport and storage described above involve a major change and considerable cost. Some of the changes discussed will not happen over night but we believe will evolve over time, the length of which will be determined by the needs of the manufacture and the rewards to the producers.